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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/602,716	06/25/2003	Chandra Mouli	M4065.0904/P904	9955

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DICKSTEIN SHAPIRO LLP  
1825 EYE STREET NW  
Washington, DC 20006-5403

EXAMINER
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MATTHEWS, COLLEEN ANN

ART UNIT	PAPER NUMBER
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2811

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/06/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

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<b>Office Action Summary</b>	<b>Application No.</b> 10/602,716	<b>Applicant(s)</b> MOULI, CHANDRA	
	<b>Examiner</b> Colleen A. Matthews	<b>Art Unit</b> 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 08 December 2006.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-23,25-71 and 73-77 is/are pending in the application.  
4a) Of the above claim(s) 14-23,25-29,42-48,63-71 and 73-77 is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-13,30-41 and 49-62 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. **Claims 1, 8-11, 30-32, 39-41, 52, and 59-62** are rejected under 35 U.S.C. 102(e) as being unpatentable over U.S. Pat. No. 6,768,149 to Mann et al (Mann).
3. **Regarding claims 1, 30, and 52**, Mann discloses an image sensor, comprising (Figure 3) an array of pixel cells formed at the surface of a substrate, where each pixel cell comprises a first transistor (302) adjacent to the photo-conversion device (310), the first transistor comprising a gate electrode and a channel region under the gate electrode, the gate electrode having a length extending from a source/drain region to the photo-conversion device and comprising at least one gate region (314) extending the length of the gate electrode (where length of the gate is considered the dimension "L" as defined by applicant in Figure 6A) and having a substantially uniform dopant type (p type) and concentration and a work-function greater than a work-function of n+Si, the channel region comprising at least one channel portion under the at least one gate region. See also col 4, line 53 – col 5 line 40.

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4. **Regarding claims 8, 39, and 59**, Mann discloses at least one gate region comprising a layer of lower doped polysilicon of a first or second conductivity type.
5. **Regarding claims 9, 40 and 60**, Mann discloses at least one gate region has a dopant profile allowing for at least partial depletion of the at least one gate region.
6. **Regarding claims 10 and 61**, Mann discloses the dopant as indium.
7. **Regarding claims 11, 41 and 62**, Mann discloses that there is approximately no active dopant in at least one portion of the channel region.
8. **Regarding claims 31-32**, Mann discloses the image sensor is a CMOS image sensor or a charge coupled device image sensor.

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. **Claims 2, 7, 12-13, 33, 38, 53 and 58** are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 6,768,148 to Mann et al.
11. **Regarding claims 2, 12-13, 33, and 53**, Mann discloses the device as above. Mann fails to disclose the transistor as a transfer transistor. Mann fails to explicitly disclose a second transistor formed over the substrate. It would have been obvious to one of ordinary skill in the art at the time the invention was made to form a plurality of

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transistors, such a reset, amplify, and transfer transistors in order to operate the image sensor properly.

12. **Regarding claims 7, 38, 58**, Mann discloses the device as above. Mann fails to disclose the gate region comprising P+ doped polysilicon. It would have been obvious to one of ordinary skill in the art at the time the invention was to select the concentration of the gate electrode since it has been held that where the general conditions of a claim are disclosed in the prior art discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

13. **Claims 3-6, 34-37 and 54-57** are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 6,768,148 to Mann et al in view of Ponomarev (Gate-Work-function Engineering Using Poly-(Si-,Ge) for High-Performance 0.18 $\mu$ m CMOS technology, IEDM 1997.

14. **Regarding claims 3-6, 34-37 and 54-57**, Mann discloses the pixel cell as above. Mann fails to disclose the at least one gate region comprises a mid-gap material including SiGe. Ponomarev teach forming a gate electrode using SiGe to control the gate work-function. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the polysilicon gate of Mann with a mid-gap material since threshold voltage can be controlled easily without threshold voltage adjustment implantations.

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15. **Claims 49-51** are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 6,768,148 to Mann et al. in view of U.S. Pat. No. 6,198,087 to Boon.

16. **Regarding claims 49-51**, Mann discloses the device as above. Mann fails to disclose a processor and an image sensor coupled to the processor. It is conventional in the art and Boon also teaches the image sensor coupled to the processor. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to couple the image sensor to the processor in order to operate the system properly.

### ***Response to Arguments***

Applicant's arguments filed 12/08/2006, have been fully considered but they are not persuasive. Applicant argues that Mann does not disclose forming at least one gate region extending the length of the gate electrode and having a substantially uniform dopant type. Examiner notes that the depiction of Mann's gate 314 is shown in a cross sectional view, not a top plan view. However, although not shown in Mann's figures, a top plan would a gate length region 314 of uniform dopant type (p-type) extending the length of the gate, where the length of the gate is considered the dimension "L" as defined by applicant in Figure 6A. Examiner further notes, that applicant's definition of gate length "L" is not in the direction of cross sectional line 6B'-6B.

### ***Conclusion***

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1. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Colleen A. Matthews whose telephone number is 571-272-1667. The examiner can normally be reached on Monday - Friday 8AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Elms can be reached on 571-272-1869. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CAM  
03/01/2007

  
Sara Crane  
Primary Examiner